Treasure Chest using Relays

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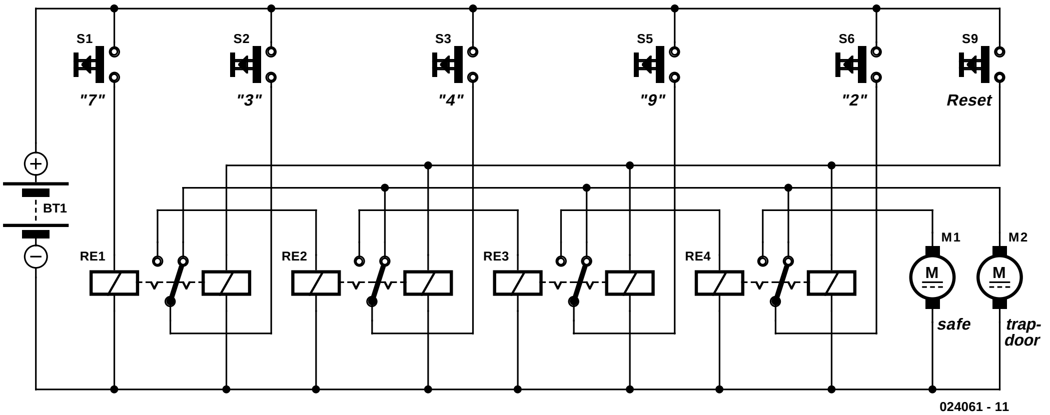
There exist special types of relay that have peculiar characteristics. Next to the 'normal' types in the catalogue we find the so-called 'latching' types which have two stable states. There are two types of latching relay, with either one or two coils. Types with just one coil are reset by applying a reverse-polarity voltage to the coil, while those with two coils are reset by applying a voltage (of the same polarity) to the second coil. It is the version with two coils that we will use in this circuit. It takes only a brief pulse of current to switch the relay's state; then it will remain in that state until reset using the other coil. Suitable latching relays are available, for example, from Conrad Electronics: they offer versions with coil voltages of 6 V (at 110 mA), 12 V (at 50 mA) and 24 V (at 27 mA), with one or two sets of changeover contacts.

The combination lock for a treasure chest can be constructed from such relays, rather than the microcontrollers more commonly employed these days. To open the treasure chest, the rightful owner needs simply to press the keys in a set sequence, whereupon the relays switch over in turn from left to right. After the last press a motor is switched on that operates the mechanism which unlocks the treasure chest. Once the valuables have been taken out, the circuit is reset by pressing the reset button.



The unauthorised intruder, should he dare to try the circuit, will find that as soon as he for example presses button 4, without having pressed 7 and 3 first in the correct order, a second motor starts up — which releases the trapdoor, dropping the intruder into the snakepit below!

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